

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-068935

(43)Date of publication of application : 10.03.1998

(51)Int.Cl.

G02F 1/1333

G02B 5/04

G02F 1/13

G02F 1/1335

G02F 1/1335

G02F 1/1345

G03B 33/12

(21)Application number : 09-116950

(71)Applicant : HITACHI LTD
HITACHI DEVICE ENG CO LTD

(22)Date of filing : 07.05.1997

(72)Inventor : NAGATA TETSUYA
TAKEMOTO KAYAO
MIYAZAWA TOSHIO
SAITO KATSUTOSHI
IGUCHI TSUDOI

(30)Priority

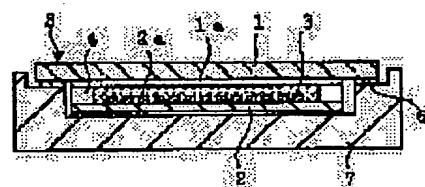
Priority number : 08116299 Priority date : 10.05.1996 Priority country : JP

(54) LIQUID CRYSTAL DISPLAY DEVICE AND PROJECTION TYPE LIQUID CRYSTAL DISPLAY DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To avert the change in the gap of a liquid crystal panel constituting a liquid crystal display module.

SOLUTION: The liquid crystal display module comprises the liquid crystal panel at least having a first substrate 1 constituting a display surface, a second substrate 2 facing this first substrate 1 and a liquid crystal layer 3 held in the opposite spacing between the first substrate and the second substrate and a package 7 housing and holding the liquid crystal panel in the state of exposing the first substrate 1. A dichroic prism is stuck to the first substrate 1. In such a case, at least the two sides of the first substrate 1 are provided with side edge parts 8 extending outward from the second substrate 2 and the one side of the second substrate 2 is provided with a flexible substrate juncture extending outward from the first substrate. The side edge parts 8 are held and fixed to the package 7 and the second substrate 2 are supported by the first substrate 1.



LEGAL STATUS

[Date of request for examination]

17.09.2001

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the

examiner's decision of rejection or application converted
registration]

[Date of final disposal for application]

[Patent number] 3465012

[Date of registration] 29.08.2003

[Number of appeal against examiner's decision of
rejection]

[Date of requesting appeal against examiner's decision
of rejection]

[Date of extinction of right]

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CLAIMS

[Claim(s)]

[Claim 1] The liquid crystal panel which has at least the liquid crystal layer pinched in the opposite gap of the 1st substrate, the 2nd substrate which countered the 1st substrate, and the 1st substrate and the 2nd substrate, The side edge section which has the flexible substrate electrically connected to said 2nd substrate, and the package which carries out hold maintenance of said liquid crystal panel, and extended in the method of outside from the 2nd substrate at at least two sides of said 1st substrate, The liquid crystal display which the flexible substrate connection which extended in the method of outside from the 1st substrate is prepared in one side of said 2nd substrate, and it comes to fix to said package in the side edge part of said 1st substrate.

[Claim 2] The liquid crystal panel which has at least the liquid crystal layer pinched in the opposite gap of the 1st substrate, the 2nd substrate which countered the 1st substrate, and the 1st substrate and the 2nd substrate, The package which carries out hold maintenance of the liquid crystal panel, and the side edge part which has the liquid crystal display module of the reflective mold which stuck the glass plate or the lens on said liquid crystal panel, and extended in the method of outside from the 2nd substrate at at least two sides of said 1st substrate, The projection mold liquid crystal display characterized by supporting said 2nd substrate with the 1st substrate while the flexible substrate connection which extended in the method of outside from the 1st substrate is prepared in one side of said 2nd substrate and fixing said package and said side edge part.

[Claim 3] The reflective mold liquid crystal display module which mounted in the package the liquid crystal panel which comes to pinch a liquid crystal layer between the 1st substrate and the 2nd substrate, The dichroic prism which stuck on said reflective mold liquid crystal display module, and was installed, In the projection mold liquid crystal display equipped with the light source which illuminates each of said reflective mold liquid crystal display module through said dichroic prism, and the optical system which projects the reflected light of said reflective mold liquid crystal display module on a screen The side edge part which extended in the method of outside from the 2nd substrate at at least two sides of said 1st substrate which constitutes said reflective mold liquid crystal display module, It is the projection mold liquid crystal display characterized by for said 2nd substrate not having been supported by said package while the flexible substrate connection which extended in the method of outside from the 1st substrate was prepared in one side of said 2nd substrate and fixing the above-mentioned side edge part to said package, but being supported with said 1st substrate.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the liquid crystal display and projection mold liquid crystal display which can control gap fluctuation of the liquid crystal layer in the liquid crystal display which mounted the liquid crystal panel in the package, and can obtain the image display of high quality.

[0002]

[Description of the Prior Art] The liquid crystal panel is widely used as the monitor of information machines and equipment, such as a television set and a personal computer, and other display devices for [various] indicating equipments.

[0003] The drive electrode used as the electric supply electrode for pixel selection or the electric supply electrode of a switching element is formed in one substrate, a common electrode is formed in the substrate of another side, and this kind of liquid crystal panel makes a two-electrodes side counter, it pinches a liquid crystal layer about lamination and this lamination gap, and is constituted.

[0004] Generally that for which the small high definition liquid crystal panel used P-SiTFT is known as a small highly minute liquid crystal panel used for viewfinders, such as an imaging means for a projection mold liquid crystal display, and a video camera, or a head mount display.

[0005] Elsewhere, a common electrode is formed in a transparence substrate, a drive electrode is formed in a silicon substrate, and what pinched the liquid crystal layer or the liquid crystal layer of giant-molecule distributed process input output equipment about both lamination gap, laid under the package, and was used as the module is known.

[0006] The mounting gestalt to the package of the liquid crystal panel for the conventional modularization is performed using the package of structure whose two substrates has opening in a viewing area and it pinches. And the liquid crystal panel and the package are fixed with adhesives. Moreover, in the small liquid crystal panel used for the module of this format, it is carrying out by making a conductive paste intervene between the electrode which carried out patterning of various kinds of electrical potential differences supplied to a drive electrode to one side of the drive substrate of the liquid crystal panel concerned and which pulled out, connected the terminal of a flexible printed circuit board to the terminal, supplied electric power in the necessary electrical potential difference, and prepared the electric supply to a common electrode in the contact section of a drive substrate, and a common electrode.

[0007] The expansion perspective view drawing 8 explains the example of structure of the conventional small liquid crystal panel to be, and drawing 9 are the sectional views which met the F-F line of drawing 8.

[0008] In ***** 1 A transparence substrate (in a common substrate or a common-substrate, and the following, it is also called the 1st substrate), the transparent common electrode which formed 1a in the inside of the 1st substrate, and 2 — a silicon substrate (a drive substrate —) The pixel electrode which formed in the inside of the 2nd substrate 2a called 2nd substrate below, A seal for 3 to close a liquid crystal layer to the 1st substrate and 2nd substrate, and for 4 close liquid crystal and 6 Ultraviolet curing mold adhesives, heat-curing mold resin adhesives Or the package of the product [7 / adhesives layers, such as a silver paste, and] made from the ceramics or plastics and 9 are. [the contact section and 2b of a flexible printed circuit board and 5] connection terminal areas.

[0009] As shown in drawing 9, between the pars basilaris ossis occipitalis of a package 7, and the 2nd

substrate 2, the conventional liquid crystal display module made the adhesives layer 6 intervene, and was fixed. Moreover, in the case of the liquid crystal panel of giant-molecule distributed process input output equipment which uses a silicon substrate for the 2nd substrate 2, the 2nd substrate 2 was fixed to the package made from a ceramic using the silver paste used by die bonding.

[0010] The liquid crystal layer 3 pinched between the 1st substrate 1 and the 2nd substrate 2 is driven to the electric field produced between each pixel electrode 2a of a pixel field, and common electrode 1a. Generally, connection terminal area 2b is prepared in the 2nd substrate 2, and the electrical potential difference which drives each pixel with connection terminal area 2b is supplied from the outside. Moreover, although an electrical potential difference is supplied also to common electrode 1a prepared in the 1st substrate, since the connection terminal area is not prepared in the 1st substrate, from connection terminal area 2b prepared in the 2nd substrate 2 to the contact section 5, wiring is prepared in it and it connects with it electrically in the contact section 5 at common electrode 1a of the 1st substrate 1. The conductive paste which are electric conduction joint material, such as a silver paste, is used for the electrical installation in this contact section 5.

[0011] the sectional view explaining the example of structure which stuck the high-reflective-liquid-crystal module which fixed to the package the liquid crystal panel which explained drawing 10 by said drawing 9 on the dichroic prism — it is — 1 — for adhesives and 7, as for a dichroic prism and 27, a package and 26 are [the 1st substrate and 2 / the 2nd substrate and 6. / a high-reflective-liquid-crystal module and 31] optical pastes. In drawing 10, the 2nd substrate 2 side is fixed to a package 7 by the heat-curing mold adhesives layer 6, and a high-reflective-liquid-crystal module is constituted, and the 1st substrate 1 is stuck to a dichroic prism 26 with the optical paste 31, and it is fixing.

[0012] The optical paste 31 is in a refractive index, ****, etc. of a dichroic prism 26 by carrying out, and prevents generating of the reflected light in the interface of the 1st substrate 1 and a dichroic prism 26, quantity of light loss, the contrast fall of a projection image, etc. using silicone oil etc.

[0013] the mimetic diagram explaining one example of the projection mold liquid crystal display with which drawing 11 used the liquid crystal display module of optical system — it is — 20 — the light source and 21 — a parabolic mirror and 22 — a condensing lens and 23 — a reflecting mirror and 24 — the 1st drawing and 25 — a lens and 26 — for the high-reflective-liquid-crystal module for green, and 27B, as for the 2nd drawing and 29, the high-reflective-liquid-crystal module for blue and 28 are [a dichroic prism and 27R / the high-reflective-liquid-crystal module for red, and 27G / a projector lens and 30.] screens.

[0014] if the configuration of the reflective mold liquid crystal display shown in drawing 11 is explained — the 3rd page of a dichroic prism 26 — respectively — high-reflective-liquid-crystal module 27for red R, and the object for green — as drawing 10 explained high-reflective-liquid-crystal module 27G and high-reflective-liquid-crystal module 27B for blue, it sticks through the optical paste 31, and it fixes with the fixed means which is not illustrated after justification so that each location may not shift.

[0015] At this time, it is necessary to fix firmly so that a location gap may not occur with the vibration under actuation of a projection mold liquid crystal display, and conveyance, or an impact.

[0016] Therefore, a means by which the above-mentioned fixed means has the operation which pushes each high-reflective-liquid-crystal modules 27R, 27G, and 27B against a dichroic prism is used.

[0017] Thus, in the constituted projection mold liquid crystal display, after the light from the light source 20 considers as a parallel ray with a parabolic mirror 21, incidence is carried out to a dichroic prism 26 through a condensing lens 22, a reflecting mirror 23, the 1st drawing 24, and a lens 25.

[0018] incident light is decomposed into three, red, green, and blue, in a dichroic prism 26 — having — high-reflective-liquid-crystal module 27for red R which was alike, respectively and was fixed and the object for green of the 3rd page — incidence is carried out to high-reflective-liquid-crystal module 27G and high-reflective-liquid-crystal module 27B for blue.

[0019] high-reflective-liquid-crystal module 27for red R, and the object for green — high-reflective-liquid-crystal module 27G and high-reflective-liquid-crystal module 27B for blue — respectively —

being alike — an image is formed by the signal to which electric power is supplied through said flexible printed circuit board 9 carried-out, and the reflected light by which incident light was modulated with this image is compounded with a dichroic prism 26, and carries out outgoing radiation from a lens 25.

[0020] By this kind of high-reflective-liquid-crystal module, the condition of dispersion according to a picture signal and reflection is taken for every pixel, and specular reflection light carries out outgoing radiation from the above-mentioned lens 25. By passing along a diaphragm of the 2nd, the scattered light of the reflected light the place which is in a dispersion condition within a viewing area, and around a viewing area is intercepted, and it is projected on a synthetic light of three colors which carried out outgoing radiation from the lens 25 on a screen 30 with a projector lens 29. Since the field of a uniform dark condition is formed in the perimeter of a viewing area, the good image display of image quality can be obtained.

[0021] thus, above-mentioned high-reflective-liquid-crystal module 27 for red R and the object for green — the full color image of the high quality which compounded the image of each color formed in high-reflective-liquid-crystal module 27G and high-reflective-liquid-crystal module 27B for blue is reproduced on a screen 30.

[0022]

[Problem(s) to be Solved by the Invention] With the structure of the above-mentioned conventional liquid crystal display module, when stress joined a package, the force was applied also to the liquid crystal panel fixed to the interior of a package, the gap between two substrates which constitute the liquid crystal panel concerned changed, the thickness of a liquid crystal layer changed, and it turned out that there is a problem of causing a remarkable poor display, such as display unevenness.

[0023] With the configuration of the above-mentioned conventional liquid crystal panel, moreover, the electrical installation (supply of a necessary electrical potential difference) between the electrode of the drive substrate 2 which is the 2nd substrate, and the electrode (common electrode 1a) of the common substrate 1 which is the 1st substrate. Since it was based on the glued connection using the conductive paste which is conductive joint material in the contact section 5, fluctuation arose about the gap which local stress is added and forms a liquid crystal layer among both the substrates in this connection part, and the problem of causing a poor display also found a certain thing.

[0024] This is especially remarkable when this kind of liquid crystal display module is applied to a projection mold liquid crystal display.

[0025] In the large-sized direct viewing type liquid crystal panel, in order to keep the gap between two substrates constant, the spacer of a plastics bead or a glass bead is distributed throughout the viewing area between substrates, but if the same spacer as a projection mold liquid crystal panel is used, the shadow of a spacer will be projected at the time of expansion projection of an image.

[0026] Therefore, in the projection mold liquid crystal panel, a glass bead or glass fiber is mixed in the substrate sealing compound inserted in the perimeter of a viewing area, and it is considering as the spacer.

[0027] Therefore, the gap between substrates will be changed with the stress of a viewing area especially slight near a core, and display quality will be degraded.

[0028] Moreover, in the projection mold liquid crystal display using the high-reflective-liquid-crystal module, the object for red, the object for green, and the object for blue, of three sheets, in order to prevent the contrast fall of the projection image by surface reflection of a liquid crystal panel, it is necessary to stick so that the liquid crystal display module of the three above-mentioned sheets may be optically stuck to the dichroic prism for color separation or color composition.

[0029] Moreover, in order to make it a gap not arise during conveyance in the location of the liquid crystal display inter module of three sheets while using what was made into the above-mentioned optical adhesion condition or, the fixed structure of pushing a liquid crystal display module against a dichroic prism, and holding it is adopted.

[0030] There was a danger of compressive force reaching between two substrates of a liquid crystal

panel, and the gap of a liquid crystal layer changing, and having caused display unevenness or causing panel destruction by this pressure.

[0031] Moreover, a conductive paste expands and contracts according to the force applied from the heat at the time of hardening, an environmental variation, or the outside in the conductive paste used for electrical installation in the above-mentioned contact section 5, and the problem on which display quality is reduced also has the gap fluctuation by stress joining both substrates.

[0032] In addition, this display unevenness may not restrict that it is discovered as initial failure, but may appear gradually with the passage of time.

[0033] Furthermore, since the drive substrate 2 which is the 2nd substrate is fixed to a package 7 in the adhesives layer 6 in the configuration of the above-mentioned conventional liquid crystal panel when an image is actually displayed With the nonuniformity of the thickness of an adhesives layer, the stress produced in case an adhesives layer pastes up with the 2nd substrate, and the stress produced by the difference in the coefficient of thermal expansion of the 2nd substrate 2 and the adhesives layer 6 It found out that the problem that the nonuniformity of the shade similar to the configuration of an adhesives layer occurs was shown in the display image outputted from a liquid crystal panel.

[0034] One purpose of this invention is to offer the liquid crystal display module which gave the structure where the gap between two substrates was not affected even if it solves many problems of the above-mentioned conventional technique and stress joins a liquid crystal display package.

[0035] One purpose of this invention is to offer the liquid crystal module using the flexible printed circuit board for electric supply which solved many problems of the above-mentioned conventional technique.

[0036] Furthermore, one purpose of this invention is to offer the projection mold liquid crystal display which used the above-mentioned liquid crystal module.

[0037]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, invention according to claim 1 The liquid crystal panel which has at least the liquid crystal layer pinched in the opposite gap of the 1st substrate, the 2nd substrate which countered the 1st substrate, and the 1st substrate and the 2nd substrate, In the liquid crystal display module which consists of a flexible substrate electrically connected to the 2nd substrate, and a package which carries out hold maintenance of the liquid crystal panel The flexible substrate connection which extended in the method of outside from the 1st substrate is prepared in the side edge part which extended in the method of outside from the 2nd substrate at at least two sides of said 1st substrate, and one side of said 2nd substrate, and said 1st substrate is set into said side edge part. It is characterized by coming to fix to said package.

[0038] By having considered as this configuration, the 1st substrate of a liquid crystal panel is mechanically connected by a package and the liquid crystal panel, since the stress impressed to the package is less than the 2nd substrate, the gap change between the 1st substrate and the 2nd substrate is not brought about, and a poor display is prevented.

[0039] In order to attain the above-mentioned purpose, moreover, invention according to claim 2 The liquid crystal panel which has at least the liquid crystal layer pinched in the opposite gap of the 1st substrate, the 2nd substrate which countered the 1st substrate, and the 1st substrate and the 2nd substrate, The package which carries out hold maintenance of the liquid crystal panel, and the side edge part which has the liquid crystal display module of the reflective mold which stuck the glass plate or the lens on said liquid crystal panel, and extended in the method of outside from the 2nd substrate at at least two sides of said 1st substrate, While the flexible substrate connection which extended in the method of outside from the 1st substrate is prepared in one side of said 2nd substrate and fixing the above-mentioned package and a side edge part, it is characterized by supporting said 2nd substrate with the 1st substrate. Since the 2nd substrate is supported by only the 1st substrate while the thrust which acts on a liquid crystal package by having considered as this configuration acts on a glass plate or a lens through the side edge part of the 1st substrate and optical adhesion with the 1st substrate, a glass plate, or a lens is fully attained, change does not arise about the gap between both substrates, and a

poor display is not generated.

[0040] In order to attain the above-mentioned purpose, moreover, invention according to claim 3 The reflective mold liquid crystal display module which mounted in the package the liquid crystal panel which comes to pinch a liquid crystal layer between the 1st substrate and the 2nd substrate, The dichroic prism which stuck said reflective mold liquid crystal display module, and installed it, In the projection mold liquid crystal display equipped with the light source which illuminates each of said reflective mold liquid crystal display module through said dichroic prism, and the optical system which projects the reflected light of a reflective mold liquid crystal display module on a screen The side edge part which extended in the method of outside from the 2nd substrate at at least two sides of said 1st substrate which constitutes said reflective mold liquid crystal display module, While the flexible substrate connection which extended in the method of outside from the 1st substrate is prepared in one side of said 2nd substrate and fixing said package and side edge part, it is characterized by supporting said 2nd substrate with the 1st substrate.

[0041] By this configuration, change of the liquid crystal layer gap of a liquid crystal panel is prevented, and a gap does not arise in the location of a liquid crystal display module, and the expansion image of high quality can be obtained.

[0042] Moreover, by having considered as this configuration, even if it holds a liquid crystal panel by sufficient thrust to a dichroic prism, the gap between the substrates of a liquid crystal panel cannot change, but a high-definition projection image can be maintained.

[0043]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to a detail with reference to the drawing of an example.

[0044] The sectional view where drawing 1 explains one example of the liquid crystal display module by this invention, drawing 2 — the time of the liquid crystal of drawing 1 — a modular expansion perspective view — it is — 1 — a transparence substrate (a common substrate or a common substrate —) 2 called 1st substrate below A silicon substrate (in a drive substrate and the following, it is also called the 2nd substrate), A seal for 3 to close a liquid crystal layer to the 1st substrate and 2nd substrate, and for 4 close liquid crystal and 6 are flexible printed circuit boards for adhesives and 7 to supply electric power to a package, and for 9 supply electric power to a liquid crystal panel.

[0045] As shown in *****, the side edge 8 of two sides (three sides shown in drawing 2 in this example) which that 1st substrate 1 counters at least has protruded the liquid crystal panel from the 2nd substrate 2, and the 2nd substrate 2 is being fixed to the 1st substrate 1 with the seal 4. The one remaining sides are the clamped edge of a flexible printed circuit board 9.

[0046] And the 2nd substrate 2 side of the side edge 8 of the 1st substrate 1 is fixed to the upper limb of a package with adhesives 6, and the 2nd substrate 2 is being fixed only to the 1st substrate 1 by the sealing compound 4.

[0047] Fix the 2nd substrate 2 side to a package 7 by the heat-curing mold adhesives layer 6, and a high-reflective-liquid-crystal module is constituted from a conventional liquid crystal display module. Although the 1st substrate and 2nd substrate are compressed between die clo IKKU and the gap of a liquid crystal layer was changed when the force was applied to the package since the 1st substrate 1 was stuck to the dichroic prism 26 with the optical paste 31 and it was fixing With the configuration of this example, the force impressed to a package acts so that only the 1st substrate may be pressed to a dichroic prism, and it does not produce gap change like above-mentioned before.

[0048] Moreover, the nonuniformity of a display image produced by fixing the 2nd tooth back and package 7 of a substrate 2 with adhesives can also be prevented.

[0049] the sectional view explaining the example of structure on which the liquid crystal display module by this invention and the dichroic prism stuck drawing 3 — it is — 1 — the 1st substrate and 2 — the 2nd substrate and 3 — a liquid crystal layer and 6 — for the side edge of the 1st substrate, and 26, as for a high-reflective-liquid-crystal module and 31, a dichroic prism and 27 are [adhesives and 7 / a

package and 8 / an optical paste and 36] heat dissipation sheets.

[0050] In this drawing, in the side edge 8 of the 1st substrate 1 of a liquid crystal panel, it fixes through adhesives 6, and a liquid crystal panel and a package 7 constitute a high-reflective-liquid-crystal module, they stick the 1st substrate 1 to a dichroic prism 26 with the optical paste 31 further, and are fixed.

[0051] The liquid crystal layer to be used changes to the condition of penetrating from the condition that are the polymer distributed liquid crystal (PDLC) which distributed the liquid crystal ingredient, and light is scattered about according to applied voltage into a macromolecule matrix. Therefore, the reflective mold liquid crystal panel using this liquid crystal layer forms an image using changing to the condition of reflecting regularly with the reflective pixel electrode formed in the 2nd substrate according to the applied voltage to a liquid crystal layer from the condition scattered about in light.

[0052] In addition, the optical paste 31 is in a refractive index, ****, etc. of a dichroic prism 26 by carrying out, and prevents generating of the reflected light in the interface of the 1st substrate 1 and a dichroic prism 26, quantity of light loss, the contrast fall of a projection image, etc. using silicone oil etc.

[0053] Moreover, when carrying out color separation using a color filter, without using dike lock prism, what applies the almost equal silicone oil of a refractive index etc. to the glass plate or lens which has carried out the anti reflection coat, sticks to it, and is fixed to it may be used for a liquid crystal panel.

[0054] And as for adhesives 6, it is desirable to use the product made from the ceramics and a liquid crystal polymer for the member to which the coefficient of thermal expansion of the 1st substrate 1 approximated the package 7 using ultraviolet curing mold resin or heat-curing mold resin, for example, the 1st substrate, in the case of barium borosilicate glass. Even if it presses a package 7 to a dichroic prism 26, in order that the thrust concerned may not act on the 2nd substrate 2 according to the structure of this example, change does not arise about the gap of a liquid crystal layer.

[0055] Therefore, the projection mold liquid crystal display using this liquid crystal display module can maintain a high-definition projection image.

[0056] In addition, as shown in ** which raises the heat dissipation effectiveness at said drawing 3, thermal conductivity is high between the 2nd substrate 2 and a package 7, and homogeneity may be filled up with the heat dissipation sheets 36, such as an elastic elastomer.

[0057] The sectional view where drawing 4 met the A-A line of drawing 2, the sectional view where drawing 5 met the B-B line of drawing 2, and drawing 6 are the sectional views which met the C-C line of drawing 2, and 8a and 8b are [a common electrode connection terminal and 9b of the anisotropy electric conduction film, and 15a and 15b] drive electrode connection terminals.

[0058] In this example, it is formed in common electrode. 1a (drawing 2) and the 2nd substrate 2 which were formed in the 1st substrate 1, and connection terminal area 2b connected to the leader of a drive electrode is connected at the same edge of one flexible printed circuit board 9.

[0059] That is, the common electrode connection terminals 15a and 15b are formed so that it may be exposed of an electric conduction side to the 1st substrate 1 side of a flexible printed circuit board 9, and drive electrode connection terminal 9b is formed so that it may be exposed of an electric conduction side to the 2nd substrate 2 side (the 1st substrate 1 side, opposite side).

[0060] And the common electrode connection terminals 15a and 15b are connected to common electrode 1a of the 1st substrate 1 through anisotropy electric conduction film 8a, and drive electrode connection terminal 9b is stuck to connection terminal area 2b of the 2nd substrate 2 by pressure through anisotropy electric conduction film 8b, and it connects. Since the configuration of those other than this is the same as that of the conventional liquid crystal panel explained by said drawing 8, explanation is omitted.

[0061] Therefore, in order to connect electrically common electrode 1a of the 1st substrate 1, and the 2nd electrode 2 and not to use a conductive paste [as / in said conventional technique], the local stress resulting from the electrical installation structure of both substrates does not occur.

[0062] Gap fluctuation of the liquid crystal layer by the external force of joining the local whole stress and the local whole substrate in the conductive connection part concerned produced in the conductive

connection of the 1st substrate using the conventional conductive paste and the 2nd substrate by this configuration is avoided, and the image display of high quality becomes possible. Drawing 7 is the explanatory view of one example of the flexible printed circuit board by this invention, and (a) of drawing 7 is a plan, the front view which saw (b) of drawing 7 from [of drawing 7 / of (a)] arrow-head D, and the sectional view where (c) of drawing 7 met the E-E line of (a) of drawing 7.

[0063] this drawing — setting — 9 — a flexible printed circuit board and 10 — for the flexible covering film for a common electrode connection terminal area, and 12, conductive thin ** and 14 are

[*****—SUFIRUMU and 11 / a flexible covering film and 11a / a common electrode connection terminal and 9b of a reinforcement film, and 15a and 15b] drive electrode connection terminals.

[0064] As illustrated, between *****—SUFIRUMU 10 and the flexible covering film 11, this flexible printed circuit board 9 has much conductive thin ** 12, and has formed terminal areas 17 and 18 in both ends at said conductive thin ** 12.

[0065] And make it expose to the *****—SUFIRUMU 10 side, and conductive thin ** located in the crosswise both ends of one terminal areas 17 considers as a common electrode connection terminal, makes residual conductive thin ** expose to the flexible covering film 11 side, and is considering as the drive electrode connection terminal.

[0066] Each of the above-mentioned common electrode connection terminal 15 of one terminal area 17 of this flexible printed circuit board 9 and drive electrode connection terminal 9b is connected to connection terminal area 2b of common electrode 1a of the 1st substrate 1, and the 2nd substrate 2 through superposition and the anisotropy electric conduction film 8a and 8a, as shown in drawing 5 and drawing 6.

[0067] The reinforcement film 14 is stuck on the terminal area 18 of another side, and deformation of the terminal area concerned is prevented. In addition, a reinforcement film can also be stuck and reinforced also like a terminal area 17.

[0068] By using this one flexible printed circuit board, it is connectable with the opposite terminal located in each by the side of common electrode connection terminal 15a, 15b, and drive electrode connection terminal 9b at coincidence.

[0069] In the example of the above-mentioned liquid crystal panel, although the polymer dispersed liquid crystal was used as a liquid crystal layer, this invention is not restricted to this and can be applied also like the liquid crystal panel using TN (TSUISUTEDDO nematic) liquid crystal currently used for the current general target. Moreover, even when not only a high-reflective-liquid-crystal module but a transparency mold liquid crystal panel is used, while using the 2nd substrate as a transparence substrate, a package is applicable similarly as a transparency mold.

[0070]

[Effect of the Invention] As explained above, according to the liquid crystal display and projection mold liquid crystal display by this invention, there is no gap change of the liquid crystal layer resulting from thrust required for the installation to a dichroic prism, and the expansion image of high quality can be obtained.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is a sectional view explaining one example of the liquid crystal display by this invention.

[Drawing 2] It is the expansion perspective view of the liquid crystal display of drawing 1 .

[Drawing 3] It is a sectional view explaining the example of structure which the liquid crystal display by this invention and the dichroic prism stuck.

[Drawing 4] It is the sectional view which met the A-A line of drawing 2 .

[Drawing 5] It is the sectional view which met the B-B line of drawing 2 .

[Drawing 6] It is the sectional view which met the C-C line of drawing 2 .

[Drawing 7] It is the explanatory view of one example of the flexible substrate by this invention.

[Drawing 8] It is an expansion perspective view explaining the example of structure of the conventional small liquid crystal panel.

[Drawing 9] It is the sectional view which met the F-F line of drawing 8 .

[Drawing 10] It is a sectional view explaining the example of structure which stuck the high-reflective-liquid-crystal module which fixed to the package the liquid crystal panel explained by drawing 8 on the dichroic prism.

[Drawing 11] It is the mimetic diagram explaining one example of the projection mold liquid crystal display using a liquid crystal display module of optical system.

[Description of Notations]

1 Transparence Substrate (1st Substrate)

1a Common electrode

2 Silicon Substrate (2nd Substrate)

2b Connection terminal area

3 Liquid Crystal Layer

4 Seal

6 Adhesives

7 Package

8 Side Edge

9 Flexible Printed Circuit Board

20 Light Source

21 Parabolic Mirror

22 Condensing Lens

23 Reflecting Mirror

24 1st Drawing

25 Lens

26 Dichroic Prism

27R The high-reflective-liquid-crystal module for red.

27G High-reflective-liquid-crystal module for green

27B The high-reflective-liquid-crystal module for blue

28 2nd Drawing

29 Projector Lens

30 Screen.

[Translation done.]